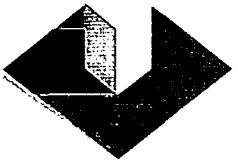
# COMMUNITY SOIL CLEANUP PLAN

## for the

## The Doe Run Company Herculaneum Smelter
## Herculanuem, Missouri



***September 25, 2001***



**THE DOE RUN COMPANY**
**HERCULANEUM SMELTER**

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Adopted By: _____ Date: _____
Tony Patruska, Environmental Protection Agency, Project Manager

Adopted By: _____ Date: _____
Dave Mosby, Missouri Department of Natural Resources, Project Manager

Adopted By: Jim Lanzafame Date: 9/25/01
Jim Lanzafame, The Doe Run Company Project Manager

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### A Project Management and Work Plan



### Attachments

## A3. Distribution List

| | |
|---|---|
| EPA – Region 7: | Tony Petruska, Project Manager |
| MDNR - Superfund | Dave Mosby, Project Manager |
| The Doe Run Company | Jim Lanzafame, Project Manager |

## A4 INTRODUCTION

The U. S. Environmental Protection Agency (EPA), Missouri Department of Natural Resources, and Doe Run Company Agreed under an Administrative Order on Consent to complete soil replacement on properties that have been identified as having levels of lead in soil above the criteria levels established for the soil.

The scope of the project will include: excavation of soil in yards, where contaminated soil from properties will be stored short and long term, new (replacement) soil handling, signed agreements, sampling to determine depth of removal and restoring grass, bushes, fences.

The objective of this soil replacement program is to remove lead tainted soil and replace this soil with clean soil.

## A5 Project Organization

Doe Run Company has oversight for this project based on their considerable experience acquired over the past 10 to 12 years of voluntary removal actions.

ERLLC has a team of experienced professionals and crew with extensive HTRW removal action experience, particularly in the specific area of residential lead excavation.

## A6 Problem Definition and Background

### A6.1 Problem Definition

The Doe Run Company in Herculaneum is comprised of a smelter that is located next to the Mississippi River in Jefferson County, Missouri. The smelter has been in Herculaneum since 1892. Over the years, the smelter has contributed to local levels of lead through emissions from fugitive and stack sources that have impacted air and soil levels in the community, while the smelter has made significant improvements, such as, filtering over 1.4 million cubic feet of air every minute which leads to a decrease in the amount of lead released into the air and increasing the height of the stack, some contamination remains in the community. Due to the perceived health risk of lead, The Doe Run Company has, over the past ten to twelve years, attempted to recognize and solve the

problems.

### A6.2 Site Description

The Doe Run Companies Herculaneum Smelter Site is located in Herculaneum Missouri in the county of Jefferson approximately 30 miles south of St. Louis. The coordinates are Latitude 038 degrees 15 minutes and 33 seconds with the Longitude of 090 degrees 22 minutes and 36 seconds. The facility occupies approximately 22 Areas along the Mississippi River. The facility is bordered on the east by the Mississippi River. The area west of the river is occupied by the smelter, residential housing, commercial and public properties. Soil replacement will be done on the area west of the Mississippi River.

The assumed typical site covers approximately 8,000 square feet (**refer to Attachment 2 – Typical Site Sketch**), with an estimated 70 ft. x 120 ft. x 1 ft. removal area. A mixture of grass covers the ground surface and driveways are generally blacktopped but occasionally gravel. The yards have some type of concrete walk, scrubs and occasionally fencing.

### A6.3 Site History

Smelting activities commenced at the Herculaneum site in about 1892. Early operations started with a shot tower and developed slowly into a larger and larger smelting facility for lead concentrates. The site has been modernized and enlarged on occasion and today can produce approximately 250,000 tons of finished lead metal. Historical fugitive emissions from the Herculaneum lead processing operation and lead from various other sources such as from gasoline and paint have been deposited on vicinity properties and have, in part, contaminated residential yards and other establishments with lead at mostly undetermined levels outside of the .4 mile radius of the smelter. Within .4 mile of the smelter a study of soil lead levels was conducted in 1990, which delineated concentration of lead in residential yards. The Doe Run Company has been replacing soils in this vicinity for the past 10 years and will finish replacement of soils on non-Doe Run owned properties out to approximately .4 miles form the smelter stack in 2001 and 2002. The 2002 project consists of approximately 65 non-Doe Run owned yards within approximately the four-tenths mile of the facility. This property will be remediated without further testing of the residences.

### A7 Project Description

A field investigation will be organized according to the sub areas designated in the Administrative Order on Consent (AOC): namely area 1 identified as located between the smelter stack and .4 miles, area 2 identified as located between .4 miles and 1 mile of the smelter and area 3 identified as located between 1 mile of the smelter and 1.5 miles from the smelter. Testing of soil will determine the extent of soil replacement. (**refer to Attachment 3- Site Location Map**). The properties are owned by various parties, who will be contacted by The Doe Run Company or their contractor (Environmental Restoration L.L.C.) for agreement to access the properties to proceed with the

activities described herein. Soil replacement will be required for the following reasons:

1) If a child six months to six years of age living at a residence has a blood lead level of 10 or greater and a soil lead in their yards of 400 mg/kg or higher. These yards regardless of which area 1, 2, or 3 will be remediated first.
2) Exceeding a soil lead level identified by using the IEUBK model - risk level is determined based on biological uptake of lead from local community soil.
3) If the IEUBK model has not yet been ran, then a soil lead level of 400 mg/kg or higher. Yards or quadrants of yards with soil levels of 2500 mg/kg or higher will be done preferentially to other yards in each area.

Testing (analytical results) done on residential yards, day care facility yards, areas in school yards, and other high use child frequented areas initiates the soil replacement process in Areas 2 and 3 above. For area one (1) which is between the smelter and .4 mile all soil not previously replaced will have soil replacement done on them within 18 month after the date of May 29, 2001. The exception to this is the Doe Run Company owned homes, which will be done after the residences in the 0 to .4 mile distance of the smelter are completed. Different risk models will be ran for school areas and parks than are ran on residential yards.

Where children six months to six years of age having a blood lead of 10 micrograms per deciliter or higher live and the soil lead level is found to be at or above 400 mg/kg, then soil replacement will start immediately. There were eight properties identified as having children in them with blood lead levels meeting this first criteria, August 2000 Community Blood Lead study. Five of these homes currently meet the criteria of having a child in this age group, a blood lead of 10 or higher, and reside at the property. For each of these, to Doe Run's best knowledge, the property owners have been contacted for soil replacement. These homes must be remediated within 30 days from September 20, 2001, if the homeowner agrees to the restoration activities. Refusals will be referred to the EPA/MDNR. People not responding or waiting for further instruction from Missouri Department of Health will be contacted again by Doe Run and EPA/MDNR will be informed of this. For these people the 30 days for restoration will not start until after property owner's sign and date the **Access/ Restoration Agreement (attachment 4)**. For other residential properties, where children having a blood lead of 10 or higher reside, the 30 day time frame will start after notification by certified letter from the Missouri Department of Health telling which properties have children meeting this criteria. Doe Run may, if informed by a parent of a child with a confirmed blood lead above 10 and they are the property owner, do testing and begin soil restoration activities prior to notification by Missouri Department of Health. Restoration of yards that meet this "Additional Work to Address Emergency Condition AOC dated September 17, 2001" applies to children identified between the time frame of August 2000 until the date of this order.

In area 2 which is form .4 miles from the smelter stack outward to the one mile distance the soil work will begin after the residences in area one have been completed excluding Doe Run owned homes. Any yards or quadrants of yards in this area which are found to have soil levels of 2500 or greater may be remediated prior to some yards in area 1. According to the AOC "Statement of Work – Appendix A" 18 months after May 29, 2001 properties with soil lead concentrations over 2500 mg/kg

will be replaced first. The number of homes to be completed per year in this area is 60, or 60 equivalent units. If school yards, parks or other large public use areas based on risk model analysis or 400 mg/kg (if a risk model analysis is not conducted) are required to be replaced then equivalent units will be utilized equivalent to 8,000 square feet.

Additionally, if lead, cadmium or zinc levels in soil are above the risk based action level calculated using the IEUBK model, (400 mg/kg, for lead only, if the model is not yet completed) at the one mile distance then removal actions may extend out to one and one-half miles from the smelter. Transect required sampling could extend the removal action out further if sampling results would indicate this. All replacement in this zone outward from the one-mile circumference will continue at the pace of a minimum of 60 yards per year or equivalent units of 60 per year. The same priorities would exist for this area as for areas closer to the smelter.

The project will include removal of up to 12 inches of contaminated soil, transport and dispose of the soil and restore the properties. Depth of soil removal will be determined on a case by case basis but if removal stops short of 12 inches then the soil analytical level must be below 400 mg/kg at the level where soil removal stops. If at 12 inches of excavation, soils are at or above 1000 mg/kg then a poly barrier must be put in place before backfilling with clean soil. Clean soil is defined as soil with lead content below 240 mg/kg.

Other soil restoration information is found elsewhere in this Plan.

## A8 Training Requirements/Certification

### A8.1 Field Personnel

All field personnel will be under the supervision of The Doe Run Company project manager or his designee. The personnel conducting the on-site activities will be experienced in lead remediation in residential soils. All field personnel will be trained to follow all health and safety procedures as outlined in the project health and safety plan. All field personnel will have required training prior to working onsite.

## A9 Mobilization

Mobilization will occur in two phases: Site Coordination Team; Removal/Restoration Crew. The Site Coordination Team, along with the Project Manager and Project Cost Accountant will be mobilized immediately upon Doe Run's request.

As soon as sufficient number of access agreements, initial property surveys, and waste characterization sampling are completed the Removal Crew will be mobilized to begin removal operations.

## A10 Site Preparation

Once the Notice to proceed has been issued a Staging Yard and Command Post will be identified and set up. Local Government and utility clearances and permits will be obtained to set up a staging area.

A generic layout of the Staging Yard is shown in **Figure 5.0 – Staging Yard**, which will be adapted to the actual conditions once the specific property has been identified. The Staging Yard will include the following:

One 8 x 20 storage trailer for equipment storage
Parking areas for both visitors and employees;
An equipment area for parking and storage of equipment and supplies;
Stockpiling areas for clean backfill material.

## A11 Site Coordination

The Site Coordination Team is responsible for contacting the owners of properties identified by the sampling investigation as requiring removal of lead impacted soils and arranging for soil removal. The Site Coordination Team's work is broken into three broad categories: Property Owner Management, Activity Documentation, and Coordination with Removal and Restoration Crews.

Property Owner Management
The Site Coordination Team will visit, in person, each property owner and any affected tenants of each property. The purpose of the visit will be to obtain signed Property Access/Agreement for property soil restoration, explain what to expect from the removal/restoration activities, set estimate of soil removal time frame, and to manage expectations.

During removal/restoration activities the Site Coordination will maintain contact with the property owner addressing any concerns which may arise. After the restoration activity the Site Coordination Team will obtain a signed Property Completion Agreement from the property owner.

Activity Documentation
From initial contact with the property owner to completion of landscape restoration the Site Coordination Team will document all activities that occur on a property. Properties will be identified by address or location if no address can be identified. The Site Coordination Team will

collect the following documentation.

Data related to the property
Photographs and Videotape of property before, during, and after onsite activities.
Calls for marking of utilities and confirmation numbers.
Any drawings of property with expectations of owners which are changes
Test results and data from onsite sampling and on the clean soil used for restoration.
Copies of the Removal and Restoration Crews documentation related to the property.
Documentation of communication with owner
The original Property Access/Agreement for property soil restoration.

Coordination with Removal/Restoration Crews

The Site Coordination Team will participate in daily schedule coordination meetings with the Removal and Restoration Crews.

## A12 Sampling and Analysis

Before excavation at a property commences, a composite sample of the material to be excavated will be collected and sent to Doe Run Laboratory or an outside testing lab, Anderson and Associates in Rolla, Missouri for TCLP analysis for lead. The sample will be a four-part composite, one sample from the front of the house, one from the back and one from each of the two sides. A 2 inch diameter sample with 6 inch depth will be collected using a shelby tube or other sampling device from each of these locations. The results of these tests will be used to determine placement of soil. TCLP tests from one property may be used to apply to other properties which are similar in the following ways; similar soil lead levels, similar physical location, and similar distance from the smelter.

Sampling by XRF prior to soil excavation may be done to determine preliminary soil depth removal.

Once excavation is completed on a property, the XRF will be used for sampling before backfilling commences. A composite sample (9 aliquots each), one from each quadrant, will be collected in an aluminum tray and mixed then analyzed by XRF. Every 10th quadrant will be analyzed by Doe Run Laboratory or sent to an outside laboratory for conformation analysis of lead.

The Chemical Sampling and Analysis plan can be looked to for a more complete description of the sampling protocol.

The material to be used for backfill will be clean soil, less than 240 mg/kg lead, before being

purchased and either hauled to a stockpile site or hauled directly to the excavation site.

Test results and any daily reports will be made part of the property's file being maintained by the Site Coordination Team.

**A13 Removal**

The Removal Crew will begin by removing any landscaping features and preparing the property for access as outlined in the Access/ Removal Agreement. All utilities, other known subsurface features, and the excavation limits will be laid-out and marked. At this time any erosion and sediment controls dictated by specific site conditions will be implemented along with Safety & Health monitoring and decontamination requirements

Once the property is prepared excavation will begin. Excavation will be accomplished primarily by using mini-excavators with handwork as necessary. Trees, shrubs, and fences will be worked around not removed and replaced. Doe Run or ERLLC may at the owner's request remove small trees or shrubs as long as no replacement is requested. Doe Run or ERLLC may choose to remove and replace certain items to facilitate soil restoration efforts.

The following is the proposed equipment to be used during removal.

Mini-excavators (7,000 to 15,000 LB machines)
Dump trucks
Trucks (3/4 and 2 ton)
Equipment trailers
Various hand-tools and small tools

Due to the limited size of the excavation zone anticipated at each property, the entire excavation area will be cut to the excavation depth determined by pre-excavation soil analysis using XRF. Maximum depth of excavation in a quadrant will be 12 inches. Affected garden areas will be removed to a soil depth of 12 inches, the soil will then be tested, if the soil is clean soil (less than 240 mg/kg) then excavation stops. A 9 aliquot composite will be used to determine this, then the garden can be backfilled. If soil lead levels are not below the criteria level then either a raised bed can be made or soil will be removed to a maximum depth of 24 inches.

If after excavation to the maximum depth of 12 inches the lead content of the soil at the bottom of the excavation still exceeds 1000 mg/kg, then a polyethylene marker barrier will be placed before backfilling of the excavated area begins.

The soil being excavated, will be wetted down if applicable for dust control, then loaded into dump trucks, tarped and hauled to the designated location approved by Doe Run Company.

At the end of each day the property will be left in neat, orderly, and secure state. If storms are expected then silt fence or straw bales of hay will be used for storm-water control.

## A14 Site Restoration

After the XRF confirmation test results are obtained for a property indicating that the excavation is ready for backfill, restoration work will begin. The Removal/Restoration Crew will haul in pre-approved clean fill material to bring the areas excavated to original lines and grades.

The backfill material will be water conditioned if needed before being hauled to the property to bring it near optimum moisture content. The material will be placed in loose lifts and then compacted. Compaction will be achieved by wheel rolling with the site equipment. The top lift, after compaction, will be scarified approximately 2 inches in preparation of seeding.

The following is the proposed equipment to be used during site restoration.

Two "Bobcat" skidsteer loaders with grader attachments
Dump trucks
Trucks (3/4 and 2 ton)
Equipment trailers
Various hand-tools and small tools

After the excavation has been backfilled to the original grade, then the area will be seeded, fertilized and strawed. Other items removed will be replaced and repairs will be made to any items damaged during the excavation process.

The Removal/Restoration Crew will notify the Site Coordination Team when restoration is complete so a walk through can be done with the property owner. The Site Coordination Team will document the completion of restoration activities with photos and video. The Removal/Restoration Crew will address punchlist items requested by the property owner.

## A15 Transportation

Soil, which fails the Toxicity Characteristic Leaching Procedure (TCLP) test for lead, will be loaded in dump trucks, tarped and then placed on asphalt south of the weigh station in the

location designated by The Doe Run Company. The soil may then be stabilized, tested and once passing the TCLP test will be placed in the designated location.

Soil which passes the TCLP test for lead is unregulated and will be loaded in dump trucks, tarped and then placed in the designated location. This soil may then be used for covering the slag pile.

## A16 Field Records

Field records should include:

- Address
- Date project starts
- Date Project is completed
- QC sample records, if applicable
- XRF sample records
- Field procedures
- Corrective action reports
- Observation notes

Attachment I



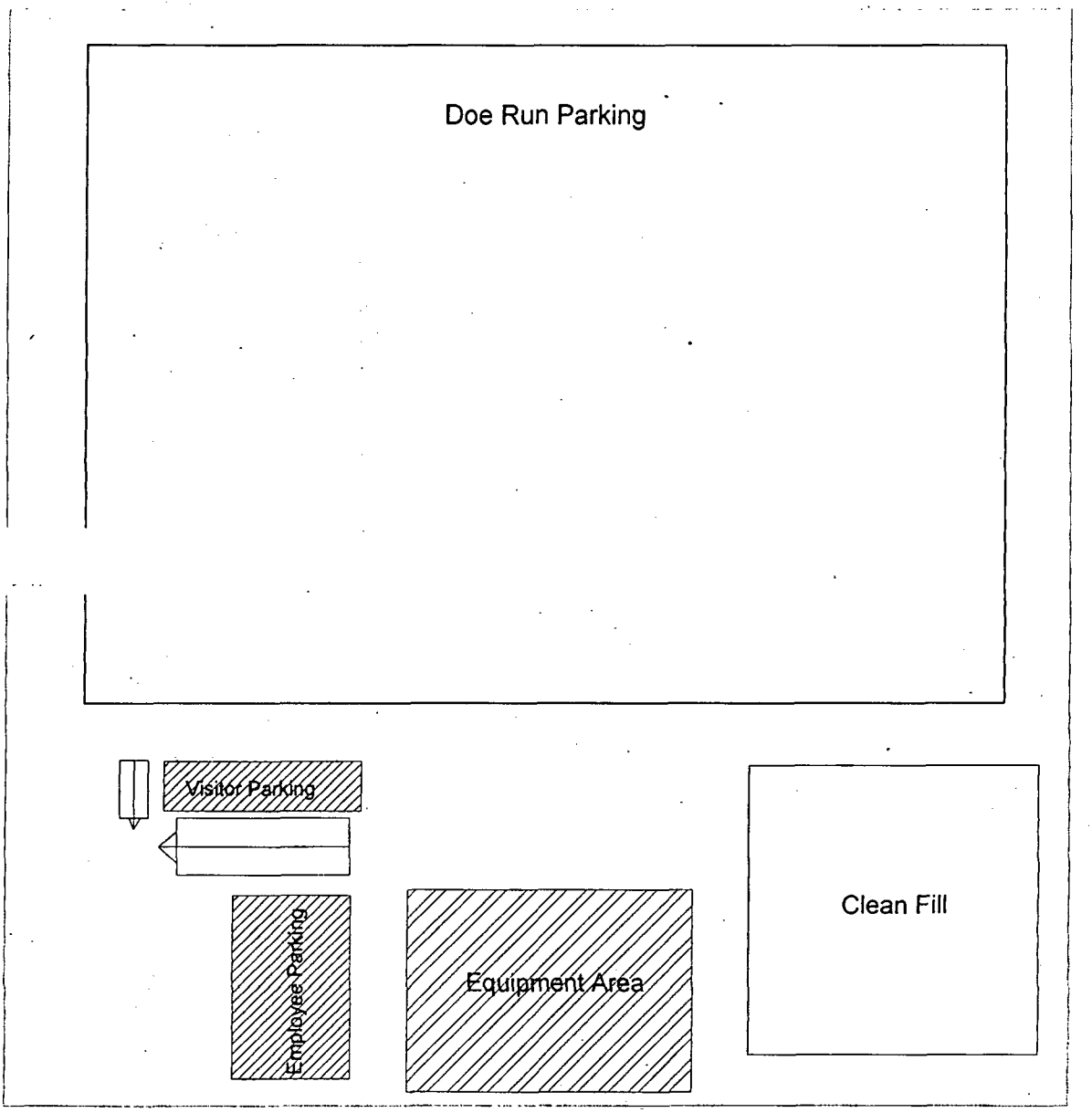
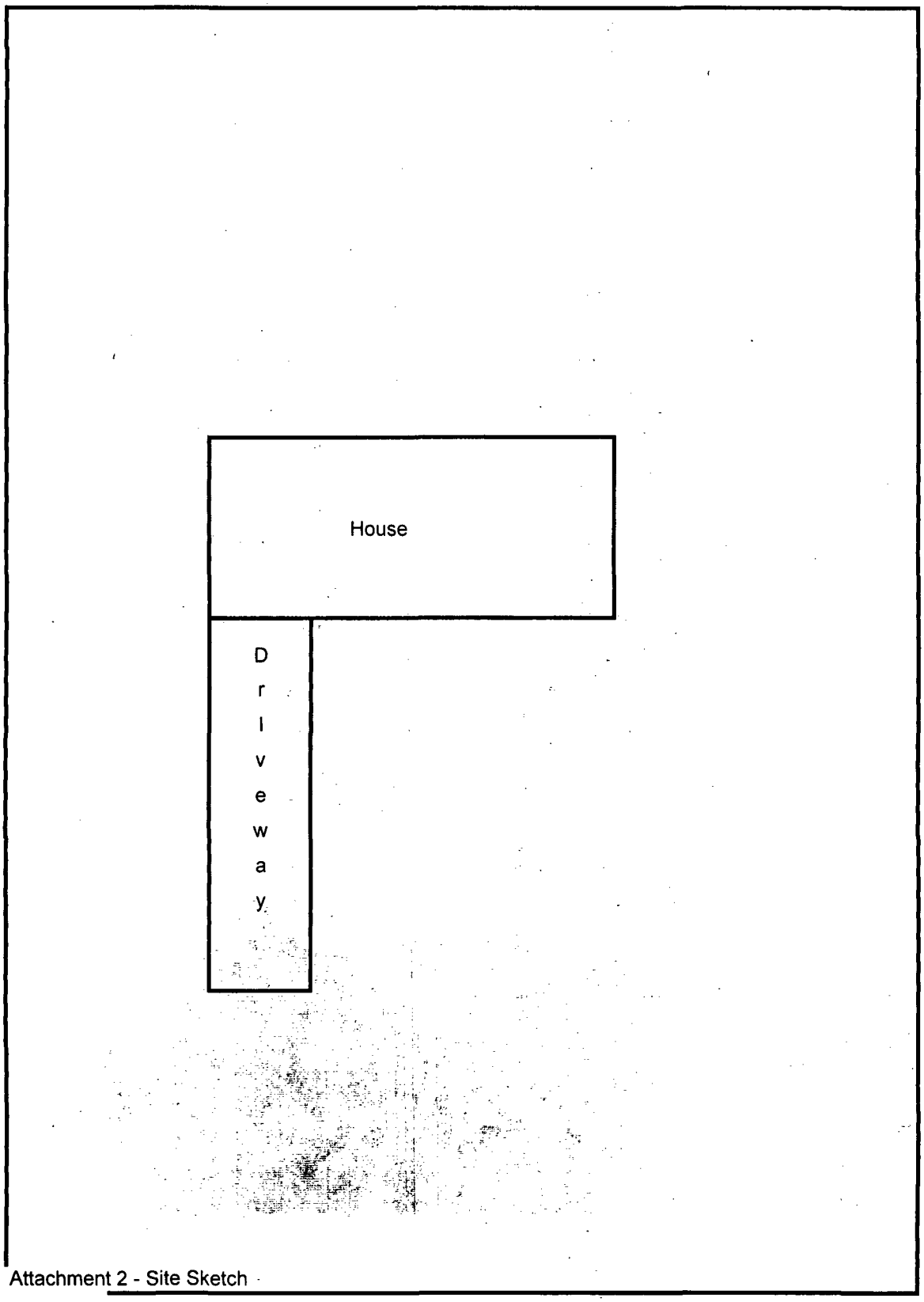



***Figure 5.0 – Staging Area***

The Doe Run Company
Herculaneum Smelter




Attachment 2 - Site Sketch

Attachment 3

Attachment 4

*Dear Mr. And Mrs. xxxxxxxx,*

Since 1991 we have conducted ten separate soil cleanup projects in Herculaneum. The locations of these projects were on Circle Street, Curved Street, Mott Street, Cross Street, Short Street, Main Street, Church Street, Dale Street and School Street. For 2001 we are prepared to begin another similar project. Your property located at xxxx xxxxx Street is included in the properties we wish to do. It is expected we will begin replacing the soils in late September of 2001.

Attached is a generalized work plan, which tells what will be done and a tentative timetable for completion.

In order to facilitate and document the work, a record will be made of the condition of the property prior to start-up, as the work proceeds, and on completion. This will enable us to ensure that the work is performed according to plan and in a manner satisfactory to you. The record prior to start-up will be pictures and video of your property including scrubs, trees and other structural features of your yard and house. The start-up record will be made upon receiving a signed agreement.

For us to proceed, we need your approval of the generalized work plan, your permission authorizing us to enter your property and perform the work as attached, and your commitment to participate and cooperate with the clean-up plan. Therefore, please sign the extra copy of this letter as indicated below and deliver that copy to us.

In return, by the signature below, The Doe Run Company pledges to perform the work as scheduled in the generalized work plan in a workman-like manner, and will be responsible to you for any damages that may occur for failing to do so.

***The Doe Run Company***

By:_____ _____
Clifton W. Gray, General Manager Date

Approval, permission and commitment given.

_____ _____
Date

_____
***Owners***

# SOIL REPLACEMENT PROJECT 2001

## WORK PLAN
## WITH ESTIMATED TIMETABLE FOR PROJECT

(The timetable will be updated based on participants)

The soil removal/replacement project will begin on September 25, 2001. The project should be completed by late fall 2001 depending on weather conditions, especially rain. Properties to be done during the 2001 year will be added to this list as homeowners agree to participate.

Doe Run has hired a professional restoration company (landscaping crew) to do this years work. The projects will be done in three stages. The first stage will be to remove the soil, the second stage will be to replace the soil and the third stage will be to replace fences, scrubs and replace small plants & trees as required. Seeding, fertilizing, and strawing will be done at the end of the week on properties that are completed. The restoration company expects to complete soil removal and replacement on from two to three yards per week.

The timetable for this project may be off by several days by the time the last part of the project is completed. However, homeowners and the city government will be notified of our progress. The project will progress in the following manner assuming everyone agrees to participate in the project.

----------**STREET**

**959 Main Street** September 20, 2001 (Thursday)

Soil removed to a depth of approximately 12 inches. Actual depth may vary based on soil analysis. Removal of old fences bushes, plant, and small trees where required to accomplish the project will be performed.

New soil brought in and placed in yard.

Yard around the house seeded, fertilized and strawed as appropriate.

**422 Reservoir Street** September 24, 2001 (Monday)

Soil removed to a depth of approximately 12 inches. Actual depth may vary based on soil analysis. Removal of old fences bushes, plant, and small trees where required to accomplish the project will be performed.

New soil brought in and placed in yard.

Yard around the house seeded, fertilized and strawed as appropriate.

## ATTACHMENT

Items for home owners to be aware of while work is being performed on their yards.

1) Once removal on your yard starts the process of removing the old soil, putting in new soil, preparing a seedbed and seeding & strawing should take an average of five working days to complete. Multiple yards may be worked on at one time. During this time:

    a) Small children should not be allowed to play in the soil.
    b) Children should be kept away from equipment.
    c) Workers removing old soil may wear respirators.
    d) Workers will be monitored for exposure to lead. Past monitoring has not indicated detectable levels of lead in air.

2) If your basement leaks currently, please let us know so that we can attempt to contour your yard and take other steps to get water away from the house.

    Basement Leaks _____
    Basement does not leak _____
    No Basement _____

3) If we use your water to water the yards from an outside hydrant, then we will pay your water bill (not the trash portion) during the months we use your water. After you have paid the bill submit a copy of the bill to Gary Walker at the Doe Run Company and the money will be reimbursed to you.

Gary Walker's Telephone Number 933-3112

4) In order to start work on your yard, items around the house must be moved out of the way. We would appreciate your assistance in removing items from the yard. Some items the landscapers will move as they work on the project.

5) Cars need to be moved away from the houses that are being worked on so workers can get equipment into and out of the yards.

6) Special items such as widened driveways or rock around the house can be done as long as we know about this ahead of time.